



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

October 4, 2016
PERMIT MODIFICATION APPROVAL
Horizontal 6A / Horizontal 6A Well - 1

EQT PRODUCTION COMPANY
120 PROFESSIONAL PLACE
BUILDING II
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for 516207
47-085-10231-00-00

Modified Azimuth of Wellbore

EQT PRODUCTION COMPANY

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: 516207
Farm Name: MORTON, JERRY
U.S. WELL NUMBER: 47-085-10231-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: October 4, 2016

Promoting a healthy environment.

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: EQT Production Company 306686 Ritchie Clay Pennsboro/Pullman
Operator ID County District Quadrangle

2) Operator's Well Number: 516207 Well Pad Name: PEN54

3) Farm Name/Surface Owner: Jerry Morton et al Public Road Access: Rt 50

4) Elevation, current ground: 1016' Elevation, proposed post-construction: 1016'

5) Well Type (a) Gas X Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow X Deep _____

Horizontal x

6) Existing Pad: Yes or No yES

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus, 6305', 49', 2190 PSI

8) Proposed Total Vertical Depth: 6305

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 17590

11) Proposed Horizontal Leg Length: 10789

12) Approximate Fresh Water Strata Depths: 99,105,302,627,729,745,770

13) Method to Determine Fresh Water Depths: By offset wells

14) Approximate Saltwater Depths: 1350

15) Approximate Coal Seam Depths: 326,789,867,1078,1182

16) Approximate Depth to Possible Void (coal mine, karst, other): None reported

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No x

(a) If Yes, provide Mine Info: Name: _____

Depth: _____

Seam: _____

Owner: _____

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18) **CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20	New	A-500	78.6	40	40	60 ft ³ / CTS
Fresh Water	13 3/8	New	J-55	54.5	900	900	793 ft ³ / CTS
Coal							
Intermediate	9 5/8	New	P-110	40	5200	5200	2046 ft ³ / CTS
Production	5 1/2	New	P-110	20	17590	17590	TOC is 50' above top producing zone
Tubing	2 3/8		J-55	4.7		May not be run, if run set 40' above top perf or 80° inclination	
Liners							

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20	26	.375	1378	1102	Class A	1.18
Fresh Water	13 3/8	17 1/2	.38	2700	2160	See Variance	1.19
Coal							
Intermediate	9 5/8	12 3/8	.395	7900	6320	See Variance	1.19
Production	5 1/2	8 1/2	.361	12640	10112	Class H	1.07/1.86
Tubing	2 3/8	NA	.19	7700			
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

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19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill and complete a new horizontal well in the Marcellus Formation. Drill the vertical to an approximate depth of 4395'. Kick off and drill curve. Drill the lateral in the Marcellus. Cement casing.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Hydraulic fracturing is completed in accordance with state regulations using water recycled from previously fractured wells and obtained from freshwater sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including 15% Hydrochloric acid, gelling agent, gel breaker, friction reducer, biocide, and scale inhibitor), referred to in the industry as a "slickwater" completion. Maximum anticipated internal casing pressure is expected to be approximately 10000 psi, maximum anticipated treating rates are expected to average approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately 200,000 barrels of water per stage. Sand sizes vary from 100 mesh to 20/40 mesh. Average approximately 200,000 pounds of sand per stage.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): No additional

22) Area to be disturbed for well pad only, less access road (acres): No additional

23) Describe centralizer placement for each casing string:

- Surface: Bow spring centralizers – One at the shoe and one spaced every 500'.
- Intermediate: Bow spring centralizers– One at the shoe and one spaced every 500'.
- Production: One solid body centralizer spaced every joint from production casing shoe to KOP

24) Describe all cement additives associated with each cement type:

Conductor: Class A no additives
Surface (Type 1 Cement): 0-3% Calcium Chloride Used to speed the setting of cement slurries, .25% Flake Loss Circulation Material (LCM) is used to combat the loss of the cement slurry to a thief zone.
Intermediate (Type 1 Cement): 0-3% Calcium Chloride. Salt is used in shallow, low temperature formations to speed the setting of cement slurries. 0.25% flake. Loss Circulation Material (LCM) is used to combat the loss of whole drilling fluid or cement slurry (not filtrate) to a thief zone.
Production: Lead (Type H Cement): 0.2% CD-20 (dispersant makes cement easier to mix). .15% SuperFL-300 (fluid loss/lengthens thickening time) .15% SEC-10 (fluid loss) 50:50 POZ (extender)
Tail (Type H Cement): 0.2% Super CR-1 (Retarder). Lengthens thickening time. .3% Super FL-200 (fluid loss) .2% SEC-10 (Fluid loss). .2% SuperFL-350 (fluid loss) Reduces amount of water lost to formation. 60 % Calcium Carbonate. Acid solubility.

25) Proposed borehole conditioning procedures:

Surface: Circulate hole clean while rotating & reciprocating the drill string until cuttings diminish at surface.
Intermediate: Circulate hole clean while rotating & reciprocating the drill string until cuttings diminish at surface.
Production: Pump marker sweep with nut plug to determine actual hole washout. Calculate a gauge holes bottoms up volume. Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean.
Check volume of cuttings coming across the shakers every 15 minutes.

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*Note: Attach additional sheets as needed.

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Well 516207 (PEN54H10)

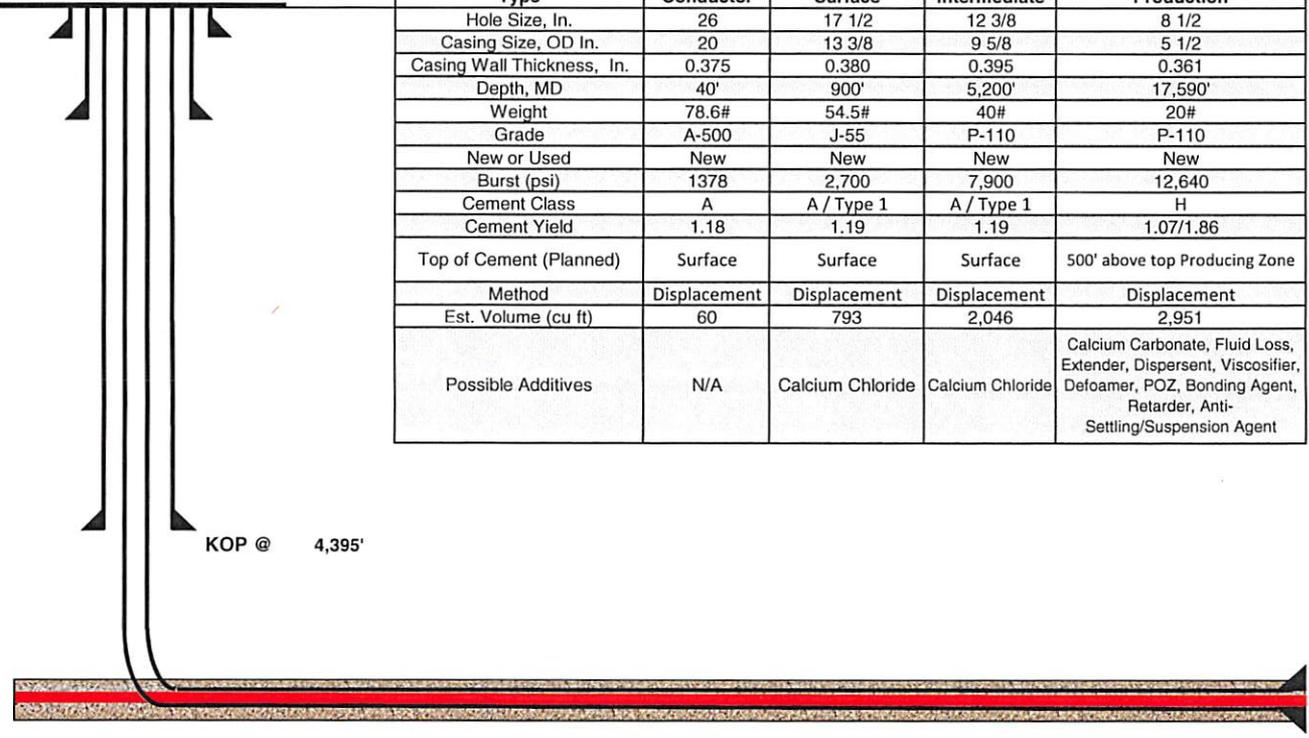
**EQT Production
Pennsboro
Ritchie County, WV**

Azimuth 155
Vertical Section 10959

Note: Diagram is not to scale

Formations	Top TVD	Base TVD
Conductor	40	
Base Fresh Water	770	
Surface Casing	900	
Base Red Rock	1120	
Maxton	1660	1774
Big Lime	1867	2007
Weir	2262	2366
Gantz	2474	2821
Fifty foot	2616	2636
Thirty foot	2679	2703
Gordon	2726	2766
Forth Sand	2816	2827
Bayard	2947	3350
Warren	3350	3417
Speechley	3429	3486
Balltown A	3949	3988
Riley	4469	4514
Benson	4982	5023
Alexander	5102	5126
Intermediate Casing	5176	
Sonyea	6016	6119
Middlesex	6119	6175
Genesee	6175	6224
Geneseo	6224	6254
Tully	6254	6269
Hamilton	6269	6275
Marcellus	6275	6324
Production Casing	17590	MD
Onondaga	6324	

Casing and Cementing		Deepest Fresh Water: 770'		
Type	Conductor	Surface	Intermediate	Production
Hole Size, In.	26	17 1/2	12 3/8	8 1/2
Casing Size, OD In.	20	13 3/8	9 5/8	5 1/2
Casing Wall Thickness, In.	0.375	0.380	0.395	0.361
Depth, MD	40'	900'	5,200'	17,590'
Weight	78.6#	54.5#	40#	20#
Grade	A-500	J-55	P-110	P-110
New or Used	New	New	New	New
Burst (psi)	1378	2,700	7,900	12,640
Cement Class	A	A / Type 1	A / Type 1	H
Cement Yield	1.18	1.19	1.19	1.07/1.86
Top of Cement (Planned)	Surface	Surface	Surface	500' above top Producing Zone
Method	Displacement	Displacement	Displacement	Displacement
Est. Volume (cu ft)	60	793	2,046	2,951
Possible Additives	N/A	Calcium Chloride	Calcium Chloride	Calcium Carbonate, Fluid Loss, Extender, Dispersant, Viscosifier, Defoamer, POZ, Bonding Agent, Retarder, Anti-Settling/Suspension Agent



Land curve @ 6,305' TVD
6,801' MD

Est. TD @ 6,305' TVD
17,590' MD

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10,789' Lateral

Proposed Well Work:
Drill and complete a new horizontal well in the Marcellus formation.
Drill the vertical to an approximate depth of 4395'.
Kick off and drill curve. Drill lateral in the Marcellus. Cement casing.

4708510231



August 10, 2016

Mr. Gene Smith
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: Casing on Wells (PEN54)

Dear Mr. Smith,

EQT is requesting the 13-3/8" surface casing be set at 900' KB, 130' below the deepest fresh water and 33' below top of workable coal at 867' KB. We will set the 9-5/8" intermediate casing at 5176' KB, 50' below the Alexander formation.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Vicki Roark', is written over a light blue horizontal line.

Vicki Roark
Permitting Supervisor

Enc.

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WW-6A1
(5/13)

Operator's Well No. 516207

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
see attached				

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

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The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: EQT Production Company
By: Victoria J. Roark
Its: Permitting Supervisor

WW-6A1 attachment

Operator's Well No.

516207

Lease No.	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>105403</u>	<u>Ellen S. Francaviglia, et al (current royalty owner)</u>		***	
	W.A. Flanagan, et al (original lessor)	The Philadelphia Company of West Virginia		LB63/295
	The Philadelphia Company of West Virginia	Pittsburgh and West Virginia Gas Company		DB55/362
	Pittsburgh and West Virginia Gas Company	Equitable Gas Company		DB 126/473
	Equitable Gas Company	Equitrans, Inc.		LB 201/253
	Equitrans, Inc.	Equitrans, LP.		AB269/182
	Equitrans, LP	Equitable Production/Eastern States, Inc.		DB234/830
	Equitable Production/Eastern States, Inc.	Equitable Production Company		CB557/56
	Equitable Production Company	EQT Production Company		DB 281/346
<u>105412</u>	<u>Mable Broadwater, et al (current royalty owner)</u>		***	
	Creed Collins and Susan Collins (original lessor)	W.A. Flanagan		LB24/317
	W.A. Flanagan	J.L. Newman		LB53/362
	J.L. Newman	The Philadelphia Company of West Virginia		LB53/363
	The Philadelphia Company of West Virginia	Pittsburgh and West Virginia Gas Company		LB55/362
	Pittsburgh and West Virginia Gas Company	Equitable Gas Company		DB126/473
	Equitable Gas Company	Equitrans, Inc.		LB201/697
	Equitrans, Inc.	Equitrans, LP.		AB269/182
	Equitrans, LP	Equitable Production/Eastern States, Inc.		DB234/830
	Equitable Production/Eastern States, Inc.	Equitable Production Company		CB557/56
	Equitable Production Company	EQT Production Company		DB281/346
<u>1005916</u>	<u>Donald R. Reynolds, et al (current royalty owner)</u>		***	
	Mary E. Sorrells (original lessor)	Eastern American Energy Corporation		LB197/229
	Eastern American Energy Corporation	Energy Corporation of American (Merger)		CB6/450
	Energy Corporation of American	Antero Resources Corporation		LB257/377
	Antero Resources Corporation	EQT Production Company		LB277/1037
<u>1005921</u>	<u>Dean E. Flanagan, et al (current royalty owner)</u>		***	
	Robert F. Johnson, et al (original lessor)	Eastern American Energy Corporation		LB202/249
	Eastern American Energy Corporation	Energy Corporation of American (Merger)		CB6/450
	Energy Corporation of American	Antero Resources Corporation		LB257/377
	Antero Resources Corporation	EQT Production Company		LB277/1037
<u>105675</u>	<u>Orma M. Johnson, et al (current royalty owner)</u>		***	
	E.J. Taylor and Laura Taylor, his wife (original lessor)	J.L. Newman		LB30/149
	J.L. Newman	The Philadelphia Company of West Virginia		LB91/265
	E.J. Taylor et ux	The Philadelphia Company of West Virginia		LB30/151
	The Philadelphia Company of West Virginia	Pittsburgh and West Virginia Gas Company		LB55/362
	Pittsburgh and West Virginia Gas Company	Equitable Gas Company		DB126/515
	Equitable Gas Company	Equitrans, Inc.		LB201/253
	Equitrans, Inc.	Equitrans, LP.		AB269/182
	Equitrans, LP	Equitable Production/Eastern States, Inc.		DB234/830
	Equitable Production/Eastern States, Inc.	EQT Production Company		CB557/56
	Equitable Production/Eastern States, Inc.	EQT Production Company		DB281/346

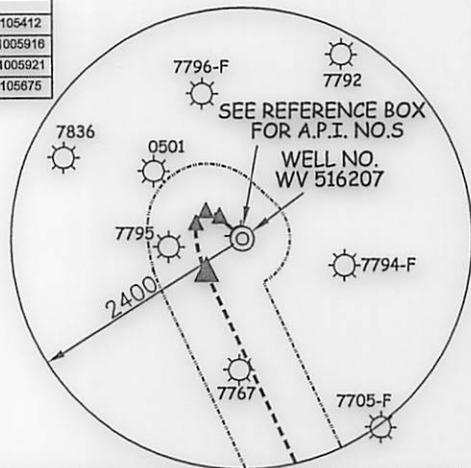
*** We will pay one-eighth of the total amount paid to or received by or allowed to the owner of the working interest at the wellhead for the oil or gas so extracted, produced, or marketed before deducting the amount to be paid to or set aside for the owner of the oil or gas in place, on all such oil or gas to be extracted, produced, or marketed from the well.

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PEN54
WV 516207
EQT PRODUCTION COMPANY

ROYALTY OWNERS		
MABLE BROADWATER ET AL	360 AC±	LEASE NO. 105412
DONALD R. REYNOLDS ET AL	128 AC±	LEASE NO. 1005918
DEAN E. FLANAGAN ET AL	153 AC±	LEASE NO. 1005921
ORMA M. JOHNSON ET AL	557.5 AC±	LEASE NO. 105675



C-TM-31-05	JERRY MORTON ET AL	243.50 ACRES±
C-TM-31-14	HEARTWOOD FORESTLAND FUND IV LP	185.30 ACRES±
C-TM-31-11	HEARTWOOD FORESTLAND FUND IV LP	351.89 ACRES±
C-TM-31-15	HEARTWOOD FORESTLAND FUND IV LP	53 ACRES±
C-TM-31-19	RANDAL LAMM	126.32 ACRES±
C-TM-32-02	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	42.51 ACRES±
C-TM-32-03	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	56.14 ACRES±
C-TM-32-04	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	47 ACRES±
C-TM-36-5.1	RANDAL LAMM	44 ACRES±
C-TM-36-05	RONNIE WAGES	66.95 ACRES±
C-TM-32-05	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	66.45 ACRES±
C-TM-32-07	COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY	57.60 ACRES±
C-TM-37-03	JACK MACKAY ET AL	235.03 ACRES±
C-TM-37-02	RONALD DODD ET AL BH	70.40 ACRES±
C-TM-37-04	JEFFERY JETT	18.31 ACRES±
C-TM-37-05	EDWIN G. WILLIAMS	40.77 ACRES±
C-TM-37-5.1	EDWIN G. WILLIAMS ET AL	23 ACRES±
C-TM-37-07	MARY SIMMONS (LIFE) ET AL	30 ACRES±
C-TM-37-08	REBECCA COTTRILL ET AL	4.3 ACRES±
C-TM-36-23	CHARLES E. COTTRILL ET AL	16.15 ACRES±
C-TM-37-5.2	ROGER & MARY WILLIAMS	8.068 ACRES±
C-TM-36-21.1	JEFFERY JETT	25.015 ACRES±
C-TM-36-21	JUNIOR COTTRILL ET AL	33.065 ACRES±
C-TM-36-21.2	JEFFERY JETT	0.472 ACRES±
C-TM-36-11.4	GARY COTTRILL	5.051 ACRES±
C-TM-36-13	ROY DODD	2.51 ACRES±
C-TM-36-11.5	GARY COTTRILL	40.847 ACRES±
C-TM-36-11	GARY COTTRILL ET AL	23.322 ACRES±
C-TM-36-11.1	PAUL COTTRILL	1.07 ACRES±
C-TM-36-11.2	JEFFERY & HEATHER MACE	0.50 ACRES±
C-TM-36-11.3	SHAWN GIBBONS	1.563 ACRES±
C-TM-36-11.6	GARY COTTRILL	0.94 ACRES±
C-TM-36-20	EVERETT McATEE ET AL	48.88 ACRES±
C-TM-36-09	PAUL HILVERS	90.70 ACRES±
C-TM-36-9.1	RANDALL & CYNTHIA OWENS	3.9997 ACRES±
C-TM-36-08	FOUSS FARMS LLC	19 ACRES±
C-TM-36-04	JACK HARGIS ET AL	45.47 ACRES±
C-TM-36-03	RANDAL LAMM	45.5 ACRES±
C-TM-31-14.1	HEARTWOOD FORESTLAND FUND IV LP	168.20 ACRES±
C-TM-31-10	DONALD DEEM ET AL	133.07 ACRES±
C-TM-31-06	HEARTWOOD FORESTLAND FUND IV LP	79.88 ACRES±

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT) N. 279,092.93 E. 1,595,832.12
 NAD'27 GEO. LAT-(N) 39.257460 LONG-(W) 80.927356
 NAD'83 UTM (M) N. 4,345,359.31 E. 506,282.13

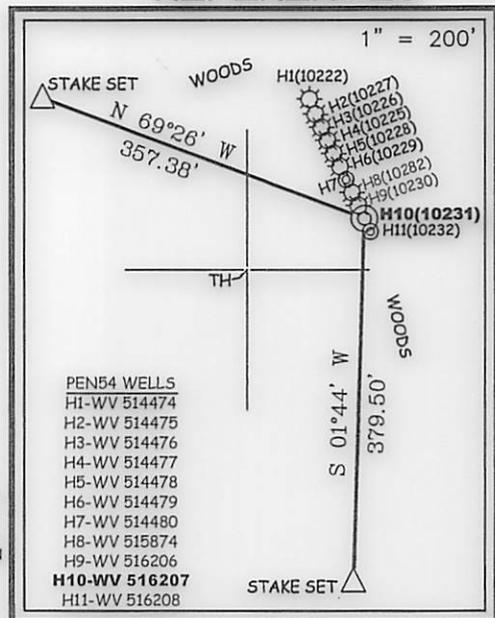
LANDING POINT

NAD'27 S.P.C.(FT) N. 278,742.45 E. 1,595,456.46
 NAD'27 GEO. LAT-(N) 39.256481 LONG-(W) 80.928663
 NAD'83 UTM (M) N. 4,345,250.62 E. 506,169.46

BOTTOM HOLE

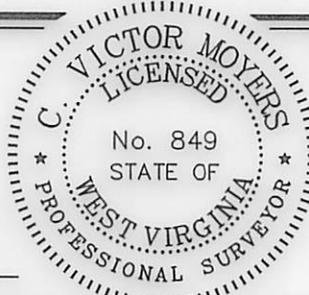
NAD'27 S.P.C.(FT) N. 268,964.48 E. 1,600,016.42
 NAD'27 GEO. LAT-(N) 39.229836 LONG-(W) 80.912019
 NAD'83 UTM (M) N. 4,342,295.02 E. 507,608.38

REFERENCES



NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
2. WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.



I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 849 *C. Victor Moyers*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE JUNE 25, 20 15
 REVISED 07/01/15 & 08/17/16
 OPERATORS WELL NO. WV 516207
 API WELL NO. 47-085-10231 *H6A*
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8083P516207R2.dwg
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE SEE NOTE 2

STATE OF WEST VIRGINIA
 DIVISION OF ENVIRONMENTAL PROTECTION
 OFFICE OF OIL AND GAS

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL IF "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION: PAD ELEVATION 1,016' WATERSHED NORTH FORK HUGHES RIVER
 DISTRICT CLAY COUNTY RITCHIE QUADRANGLES PENNSBORO & PULLMAN 7.5'

SURFACE OWNER JERRY MORTON ET AL ACREAGE 243.50±
 ROYALTY OWNER ELLEN S. FRANCAVIGLIA ET AL ACREAGE 268±
 PROPOSED WORK: LEASE NO. 105403

DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) _____ TARGET FORMATION MARCELLUS
 ESTIMATED DEPTH 6,305'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

7,342'
 12,459'
 BOTTOM HOLE LONGITUDE 80°52'30"
 TOP HOLE LONGITUDE 80°55'00"
 COUNTY NAME
 PERMIT

PEN54
WV 516207
EQT PRODUCTION COMPANY

NAD'27 GRID NORTH

7,342'

BOTTOM HOLE LONGITUDE 80°52'30"

TOP HOLE LONGITUDE 80°55'00"

WELL TIES		
ID	BEARING	DISTANCE
L1	S 50°44' W	1599.83'
L2	S 46°44' E	1686.88'

BUILD OUT DATA		
ID	BEARING	DISTANCE
L3	N 47°15' W	322.38'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	156.38'	198.93'	N 67°53'52" W	152.38'
C2	179.96'	136.55'	S 39°20'59" W	167.22'
C3	514.73'	995.72'	S 12°16'43" E	509.02'

LATERAL		
ID	BEARING	DISTANCE
L4	S 25°00' E	10788.98'



SLS
Land & Energy Development
Solutions from the ground up.
 P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26351 • (304) 462-5634
 www.slsurveys.com

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'27 S.P.C.(FT) N. 279,092.93 E. 1,595,832.12
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 NAD'83 UTM (M) N. 4,342,295.02 E. 507,608.38



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- STATE ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- CLAY DISTRICT TAX MAP-PARCEL

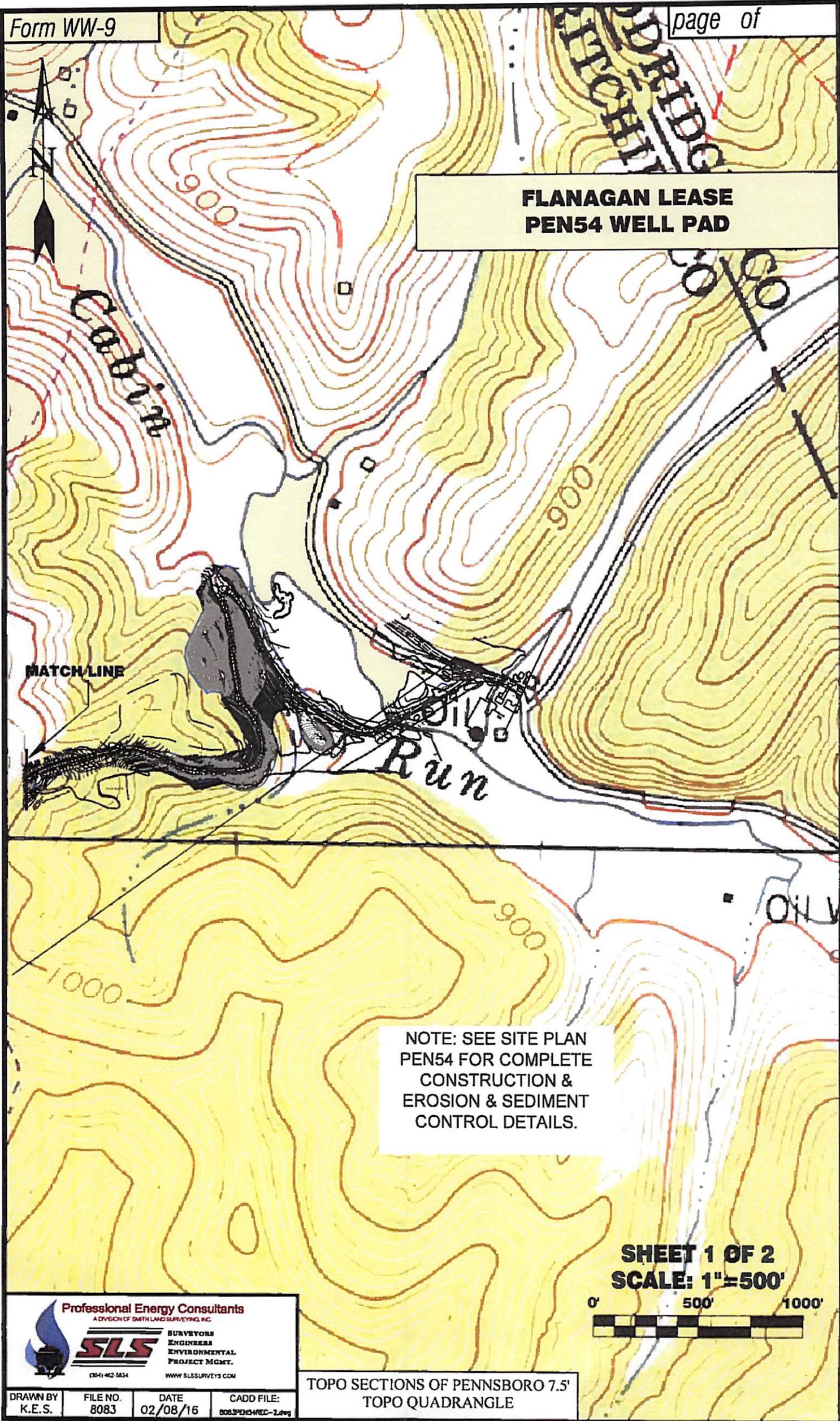
C-TM-00-00

SCALE 1" = 2000' FILE NO. 8083P516207R2
 DATE JUNE 25, 20 15
 REVISED 07/01/15 & 08/17/16
 OPERATORS WELL NO. WV 516207
 API WELL NO. 47-085-10231
 NO. STATE COUNTY PERMIT

STATE OF WEST VIRGINIA
 DIVISION OF ENVIRONMENTAL PROTECTION
 OFFICE OF OIL AND GAS



WELL OPERATOR **EQT PRODUCTION COMPANY** DESIGNATED AGENT **REX C. RAY**
 ADDRESS **115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330** ADDRESS **115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330**



**FLANAGAN LEASE
PEN54 WELL PAD**

MATCH LINE

NOTE: SEE SITE PLAN
PEN54 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.

**SHEET 1 OF 2
SCALE: 1"=500'**



Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.

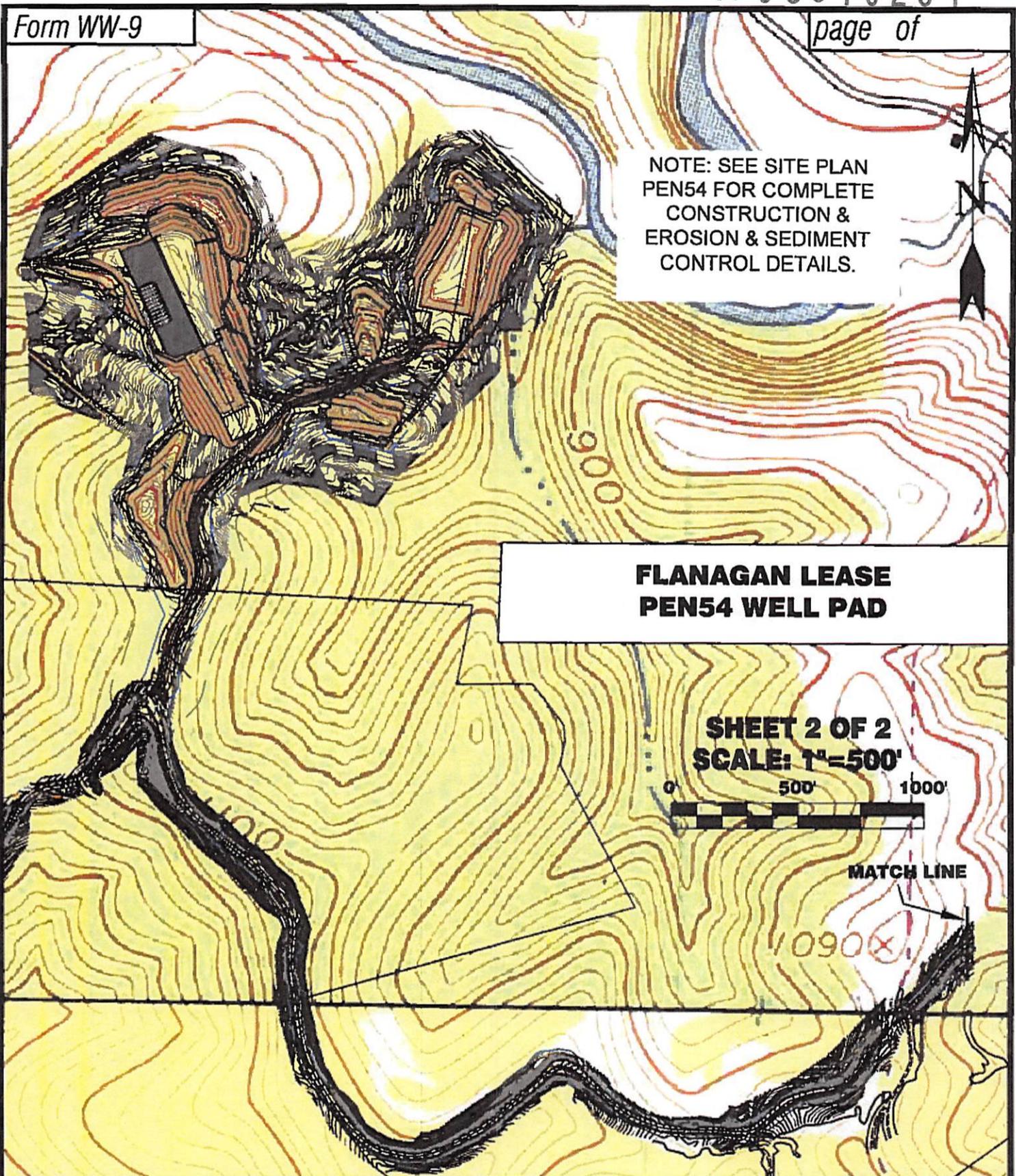


SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
(304) 462-5634
WWW.SLSURVEYS.COM

DRAWN BY K.E.S.	FILE NO. 8083	DATE 02/08/16	CADD FILE: 8083PEN54REC-2.dwg
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TOPO SECTIONS OF PENNSBORO 7.5'
TOPO QUADRANGLE

NOTE: SEE SITE PLAN PEN54 FOR COMPLETE CONSTRUCTION & EROSION & SEDIMENT CONTROL DETAILS.



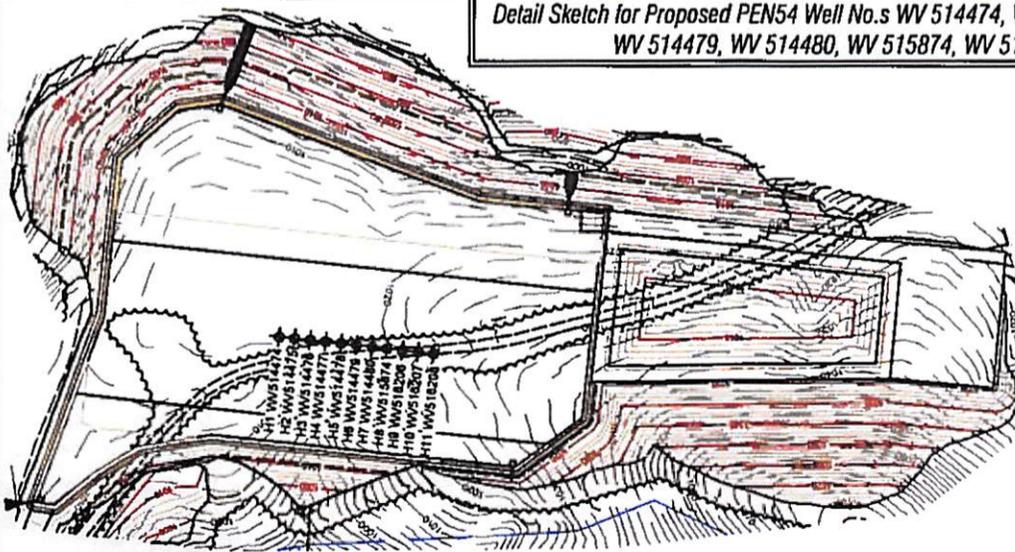
**FLANAGAN LEASE
PEN54 WELL PAD**

**SHEET 2 OF 2
SCALE: 1"=500'**



MATCH LINE

Detail Sketch for Proposed PEN54 Well No.s WV 514474, WV 514475, WV 514476, WV 514477, WV 514478, WV 514479, WV 514480, WV 515874, WV 516206, WV 516207 & WV 516208



NOTE: SEE SITE PLAN PEN54 FOR COMPLETE CONSTRUCTION & EROSION & SEDIMENT CONTROL DETAILS.

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**SURVEYORS
ENGINEERS
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PROJECT MGMT.**

(304) 482-5834
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TOPO SECTIONS OF PENNSBORO 7.5'
TOPO QUADRANGLE

Not To Scale

DRAWN BY K.E.S.	FILE NO. 8083	DATE 02/08/16	CADD FILE: 603PEN54REC-2.dwg
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August 18, 2016

Mr. Gene Smith
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: Modification of 47-085-10231

Dear Mr. Smith,

Enclosed is an updated WW-6B, schematics, WW-6A1, mylar plat and rec plan. The wellbore azimuth has been changed. The top hole has not moved.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Vicki Roark'.

Vicki Roark
Permitting Supervisor-WV

Enc.

Received
Office of Oil & Gas
AUG 19 2016